

Research Article

The Role of Parental Knowledge on Stem Cells of Children's Deciduous Teeth

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ABSTRACT:

Introduction: Stem cells found in the pulp of deciduous teeth shed can be used to treat a variety of diseases and treatments for restructuring and modernization also used. The aim of this study was to assess the awareness of parents about the importance of stem cells of children's deciduous teeth in Tehran.

Materials and Methods: This study is cross-sectional, descriptive and analytic based on the design of a self-administered structured questionnaire with closed questions among 384 parents referred to clinics and dental offices in Tehran. Data obtained using one-way ANOVA, t-test, Pearson and Spearman correlation analysis ($\alpha=0.05$).

Results: Of the total sample 379 was women (73.7%) and 105 men (37.3 percent). The average age was 37.55 years old parents. Average score of knowledge in the entire sample 3.83 ± 4.85 was the score knowledge of mothers (3.91 ± 5.08) of fathers (3.54 ± 4.31) was higher. Spearman correlation coefficient showed there was a significant relationship between parents with children and the awareness score ($r = -1.0$ and p value = 0.05), location (P value = 0.001), economy ($r = 443.0$ P value <0.001), parent education level ($r = 556.0$ p value <0.001), parent's job status (P value <0.001) and the number of visits to the dentist ($r = -337.0$ P value <0.001). However, no significant correlation was not found between mean knowledge score and age ($R = -7.0$, p value = 176.0).

Conclusion: The findings showed that parental knowledge regarding stem cells of deciduous teeth is poor.

Keywords: parental awareness, stem cells, deciduous teeth

INTRODUCTION:

Stem cells are cells with the ability to reproduce themselves and differentiate into at least two types of different cells (1). The self-renewal characteristics of stem cells enables them to be involved in multiple cycles of cell division whilst maintaining the ability to differentiate into different types of mature cells and also the undifferentiated state (2). There are primarily two types of stem cells: embryonic stem cells (ESCs) and adult stem cells (ASCs). The embryos which from the human embryonic stem cells are derived are usually 4 to 5 days old (blastocyst stage) and their use is morally questionable as to achieve these cells requires destroying embryos (3). Embryonic stem cells are actually the most

pluripotent stem cells that have a high capacity of proliferation and differentiation (4). However, if the proliferation and differentiation of these cells is not well controlled, there is a risk of neoplastic changes in these cells. Adult stem cells do not require the destruction of the fetus and, although their ability is less than the embryonic counterpart, they have used successfully in the treatment of diseases (5, 6). Some sources of adult stem cells include umbilical cord blood, amniotic fluid, bone marrow, brain, teeth, skin and urine (7, 8). Dental stem cells (DSCs) derived from tooth structures, especially dental pulp, are one of the adult stem cells that can be achieved with minimal invasive procedures (9, 10). In 3000, dental pulp stem cells

(DPSCs,) were discovered from the human dental pulp tissues of extracted impacted third molar for the first time in the world by Songtao shi and Stan Gvanthos (7). Later Shi's group has successfully obtained other types of human dental pulp derived stem cells from dental pulp of human exfoliated deciduous teeth (SHED) (11), stem cells from apical papilla (SCAP) (12) and supernumerary tooth-derived stem cells (SNTSCs) (13).

According to recent studies dental pulp derived stem cells express following characteristics such as self-renewal ability (14, 15), high proliferative activity (14), multipotency and in vivo tissue regeneration capacity such as regeneration of the dentin / pulp complex (7, 13), root regeneration (12) and bone regeneration (16, 17). Also these cells can be used for treatment of different diseases such as neural diseases [Alzheimer's disease (18), Parkinson's disease (19), Ameliorates the motor function in spinal cord injury (20) and recovers the neurological symptoms in patients with cerebral infraction (21)], autoimmune diseases [systemic lupus erythematosus] (22, 23), bone diseases [ameliorate the early stage of postmenopausal osteoporosis] (24), liver diseases [cirrhosis of the liver] (25), diabetes (26) and cardiac ischemia (27). Since cryopreserved human dental pulp tissues maintain the stem cells, bank of these cells is suitable for future treatments and in this regard, several banks in the world have been established (28, 29).

On the other hand, many challenges in society in the use of stem cells can be seen and pros and cons of these areas each have their special ideas (30). Unfortunately, most research suggests that lack of information and education about the potential of stem cells to treat a variety of illnesses resulting in the loss of millions of deciduous teeth instead of keeping them for the next applications. Dentists, pediatricians and other health professionals at the head of this community and their patients should be aware of keeping their deciduous teeth. Lyssikatos (31) in 2012, in a

study of 107 parents found that 97.7% of parents were unaware of the presence of stem cells.

Goomer et al (32) in 2014 in his study on 350 parents showed that 63% were aware of the importance of stem cells of which only 18.8% were aware of the presence of stem cells in pulp of deciduous teeth. Saran et al (33) in 2015 in a study of 1009 parents of primary school children in India concluded that knowledge of dental stem cells and stem cells in general is poor. Sede et al (5) in 2013 examined knowledge and attitude of application of dentistry stem cells in 300 Nigerian dentists. In their study showed that despite the high knowledge and positive attitude among Nigerian dentists, knowledge of using stem cells was poor in them.

Noorbakhsh (34) in 2016 in a study of 308 general dentists and 83 specialist dentists in Tehran showed despite the relatively high positive knowledge and attitude, knowledge about the application of stem cells is weak. Unfortunately, many families that are not successful to maintain their child's umbilical cord, due to lack of knowledge of deciduous teeth to extract stem cells and the ability to treat a variety of diseases, don't efforts to keep their child's stem cells of deciduous teeth, the knowledge of people about this issue to storage of stem cells is important. Since the main role of parents in their children's health and given that, there is no information on parents aware of stem cells in deciduous teeth in Iran, the study aimed to investigate the awareness of parents about the importance of stem cells in deciduous teeth of children in Tehran. Null hypothesis now is that parental knowledge about the importance of stem cells of deciduous teeth is poor.

MATERIALS AND METHODS:

This study is cross-sectional, descriptive and analytical and the study was administered based on a structured questionnaire with closed questions. This study was conducted on 384 parents with the sample mean knowledge score at confidence level 95% and maximum error of 0.3 estimated. Inclusion criteria of the study, parents of

children 6-13 years old referred to clinics and dental offices in Tehran with informed consent to participate in the study. Exclusion criteria were questionnaire to parents of children for whatever reason did not complete them. Morally responsibility and cooperation of parents was voluntary, all questionnaire information is strictly confidential and it tied to evaluate the entire process carried out with the utmost accuracy and faithfulness.

Sampling by referring to clinics and dental offices in Tehran in autumn and winter 2015 was performed. Sampling in this way in the different parts of the city four zones as a cluster according to selection criteria and then into clusters (different parts of city) clinics, dental offices and using a number to each of them randomly selected. For each clinic a day of the week randomly selected and from patients referred to the clinics and physicians' offices samples randomly was selected and to complete the appropriate sample size for the clinics and offices, it continued.

Questionnaire

In this study data collection tools was a self-administered structured questionnaire containing 13 closed questions with single answer with fluent Persian language and with the help of previous studies, published papers on the use of stem cells and available online resources were set (31-33, 35). After distributing and collecting questionnaires, pamphlets to raise awareness among parents were distributed. In order to ensure the content validity, questions for the survey to each of the experts was provided.

For grading the necessary of question expert were asked to respond to each according to the following pattern:

Questions with a high degree of appropriateness: 1. question with a average degree of appropriateness: 2. question with a low appropriateness level: 3. In addition, experts were asked about any of the questions if have specific proposals, they wrote. After studying the results

of the survey, the questions that have earned score of 2 or 3 were removed or were modified according to experts in this field. The initial questionnaire contains 16 questions to measure knowledge, after studying four poll results removed and the final questionnaire included 13 questions on knowledge and a question about the source of information. The questions came again to the final approval of experts. In the end, expert opinion on the face validity was evaluated. Questions about knowledge of parents of children 6-13 years old in Tehran about the stem cells of deciduous teeth based on point Likert scores were as follows: unawareness 0 awareness 1" to assess the reliability questions, questionnaires as pilot between 15 for parents were distributed randomly. According to kappa was calculated for questions (0.7 to 1) the reliability of the questions was confirmed.

The final questionnaire consisted of two parts:

Part I: The questions including demographic information such as age (in years), gender (male / female), religion (Muslim, Christian, Jewish, and other faiths), location (Esfahan, townships, villages of province), education level of respondent's parent (elementary, cycle, diploma, associate degree and doctoral. and above), respondent parent job (employee, worker, retired, free, unemployed, housewives, home office, etc.), spouse's education (elementary, cycle, diploma, associate degree and doctoral and above), husband's job (employee, worker, retired, employed, unemployed, housewives, home office, etc.), economic status (very poor, lower middle, middle, upper middle, very good) and the number of visits to the dentist (once at 6 months a year, pain time, etc)

Part II: These questions included parent's scientific information of stem cells of the deciduous teeth and contain 13 questions with a minimum score of 0 and maximum score was 12.

Data entered in statistical SPSS22 software using independent T-test, correlation coefficient

spearman and pearson, ANOVA and completed Tukey test was analyzed ($\alpha = 0.05$).

FINDINGS:

The sample consisted of 384 parents referred to clinics and dental offices in Tehran that 379 of them mother (73.7%) and 105 fathers (37.3 percent). The average age of the total sample 6.37 ± 37.55 with a maximum age of 60 and the minimum age was 33. Of the 384 parents participating in the study was 383 cases (99.7%) one Muslim and one Jew (0.3%). Of the sample of 333 inhabitants in the Tehran province (86.5%) and 45 people living in towns (11.7%) and 6 rural areas of Tehran (1.6 percent). Education level of parents participating in the study were as follows: 30 primary (3.5%), 37 cycles (7%), 130 diplomas (39.9%), 47 associate degree (13.3%), BA 133 (36.6%), 33 MA (8.6%) and 35 patients with PhDs and higher (6.5 percent).

Employment status of parents participating in the study was as follows:

135 employees (33.6%), 10 worker (3.6%), 9 pensioners (3.3%), 31 (8.1%) free job, 3 (0.5%) unemployment, 179 housewife (46.6%), 4 person household jobs (1%) and 34 patients other options (6.3%) were selected.

Average score of knowledge in the entire sample was 3.83 ± 4.85 on 0-13. Average score of knowledge among mothers 3.91 ± 5.08 and fathers 3.54 ± 4.38 . T-test showed that there is a significant difference between the mean knowledge of mothers and fathers (p value = 0.048) and the rate among women is higher. The average score of knowledge of residents in Tehran was (3.76 ± 5.34), residents of the city (1.78 ± 1.77) and rural residents (1.63 ± 0.66). ANOVA test showed that there is a significant difference between the mean score of knowledge and their location living (p value = 0.001). Completing it after LSD test showed that there is a significant difference between mean scores of knowledge of residents and residents of cities (p value <0.001) as well as residents of the village (p

value = 0.003) in the residents rate was higher in Tehran.

However, there was no significant difference the mean score of knowledge in residents of the city with residents of the village. (P value = 481.0) Pearson correlation coefficient showed a significant relationship between mean score of knowledge and parents age ($r = -7.0$. P value = 176.0) Spearman correlation coefficient showed that there is an inverse weak significant relationship between the mean score of knowledge and number of children ($r = -0.1$ p value = 0.05). Therefore, by increasing the number of children level of knowledge was reduced. The test showed that there is a direct correlation between mean scores of knowledge and education of parent respondents ($r = 0.556$ p value <0.001). In such a way the average score of knowledge of parents with higher education (PhD and above) (3.45 ± 9.36) than the average score of knowledge of parents with lower education (elementary) is more (3.84 ± 1.55). ANOVA showed that there is a significant difference between the mean score of knowledge and respondents parent jobs (P value <0.001).

On completing Tukey test, it indicated that there is a significant difference between other options jobs (professor, doctor, dentist, etc.) and other jobs mentioned in the questionnaire. The test showed that there is a significant difference between the mean score of knowledge workers (p value <0.001), employees and homemakers (p value <0.001) and options to other employees (p value = 0.005). The score of knowledge careers other options were chosen (3.16 ± 8.37) the highest and lowest score of knowledge workers (3.58 ± 3.70). There is a significant difference between mean score of knowledge workers (3.58 ± 3.70) (p value <0.001), retired persons (3.33 ± 3.89) (p value = 0.033), persons employed ($98 / 7 \pm 4.10$) (p value <0.001), housewives (3.70 ± 3.85) (p value <0.001), those with household jobs (3.30 ± 3.35) (p value <0.001) and those who choose other occupations (3.16 ± 8.37) were chosen.

There was a significant difference between the knowledge of his jobs was lower than other options. Spearman correlation coefficient showed that there is a direct correlation between mean scores of knowledge and partner education ($r = 0.536$ p value <0.001). In such a way the mean parental knowledge that women with higher education (PhD above) and (3.11 ± 0.95) than the average score of knowledge of parents that wives with lower education (elementary) (3.43 ± 9.19) is more. The test showed that there is a direct correlation between the mean knowledge and economic situation of the family ($r = 0.443$ p value <0.001). Therefore, families with very good economic situation of higher knowledge scores (3.93 ± 9.04) than households with very poor economic situation (3.38 ± 1.37) showed. Spearman correlation coefficient showed that there is an inverse correlation between the mean score of knowledge and the number of visits to the dentist ($r = -0.337$ p value <0.001). Therefore,

people who visit the dentist every 6 months have higher average score knowledge (3.38 ± 7.53) than people who have visited a dentist with pain (3.69 ± 3.68). Studies in 144 patients (37.5%) were not aware of the first three questions and others who were aware of the various sources of information, reported in accordance with Figure 1. ANOVA showed that there was a significant difference between the various sources of the patients and parents knowledge (p value = 0.005). Completing of Tukey test showed there is a significant difference between the mean score of knowledge through the knowledge book (3.39 ± 8.33). With those from television (3.69 ± 6.61) (p value = 0.013) or social networks have gained information (3.38 ± 4.80) (p value = 0.043) in the rate of those have obtained their information through books more and other is not significant (p value > 0.05). Table 1 show frequency distribution and mean scores of questions about the application of stem cells of deciduous teeth.

Frequency-average Dimension of awareness		Frequency response		Mean (SD)
		Correct	False	
1	Familiarity with word stem cells	333	150	49.0±61.0
		8.60%	3.39%	
2	Understanding the benefits of stem cell usage	356	168	50.0±56.0
		3.56%	8.43%	
3	Information from sources and methods	174	308	73.0±49.0
		3.45%	3.54%	
4	Inconsistent application of stem cells with religion	307	177	50.0±54.0
		9.53%	1.46%	
5	Inconsistent application of stem cells and the law	317	167	50.0±56.0
		5.56%	5.43%	
6	The availability of stem cell	309	175	50.0±54.0
		4.54%	6.45%	
7	The availability of stem cells of deciduous teeth	157	337	49.0±41.0
		9.40%	1.59%	
8	Ease of extraction of dental stem cells than other methods	89	395	43.0±33.0
		3.33%	8.76%	
9	The availability of stem cell of deciduous teeth in Iran	36	357	35.0±07.0
		8.6%	3.93%	
10	Knowing the low cost dental stem cell extraction than any other source	67	317	38.0±17.0
		4.17%	6.83%	
11	Non-invasive dental extraction of stem cells than other methods	83	301	41.0±33.0
		6.31%	4.78%	
12	The desire to have a child's baby teeth stem cell maintenance	171	313	50.0±45.0
		6.44%	4.55%	
Total score of knowledge				83.3±85.4

Table 1: frequency distribution and mean scores of questions about the application of stem cells in deciduous teeth.

DISCUSSION:

The results of this study, the hypothesis that parent knowledge about the importance of stem cells in deciduous teeth is weak, are confirmed. Parents participating in the study had an average age of 55.37 years and most of them were living in Tehran. The number of participants in this study was 384, of whom 379 (73.7%) mothers and 105 (37.3%) were the fathers of the study of Saran et al (33) which parent took on in 1009 was lower. The gender distribution parents in his study almost the same (37.3% male and 63.7% female). However, compared with study participants Lyssikatos (107 female parent) (31) and Goomer et al (parent 350) (33) number of the present study participants were more.

In this study, score of parent's knowledge about stem cells of deciduous teeth was poor, with studies Saran et al (33), Lyssikatos (31) and Goomer et al (32) are aligned. In the present study, it was shown that people living in the Tehran than residents of cities and villages of Tehran are more aware. This reflects greater access to information resources in large cities and rural areas than in cities and the need to increase knowledge, particularly in health centers.

Also in this study, it was shown that the inverse relationship between the number of children and the average score of knowledge is weak, by increasing the number of children parent's knowledge decreased. This shows an increase in the number of children, parents have fewer opportunities to study and increase their information, resulting in better service to children. In the present study, it was shown that with increasing educational level of parents, knowledge of the stem cells is more while in the study Goomer et al (32) both educated and uneducated group has less knowledge about stem cells of deciduous teeth. Also in this study, there is no significant relationship between knowledge and economic status of the family in such a way the better economic situation awareness is higher. In research done on stem cells from the perspectives of parent's access to information

resources first, then Internet, Broadcasting and then book were reported, while in the Goomer et al (32) Internet ranked first and friends and acquaintances had the second rank, Broadcasting had last rank. The study also Saran et al (33) parent Internet first and family doctor second, access to information sources have reported and Broadcasting in the last ranks of their information resources.

In this Lyssikatos (31) Broadcasting first rank and then the Internet as second rank to access to information has been reported that is relevant to the study. Given that the majority of parents in this study broadcasting as first rank of source of information have introduced, increasing knowledge through broadcasting programs on this issue is essential. In this study, parents who send their children to the dentist every six months or once a year, are the parents of the child toothache, will refer to the dentist and had higher knowledge about the existence of stem cells of deciduous teeth that it would be due notification to parents for non-emergency dentist regularly is referred to him. In this Lyssikatos (31) and Goomer et al (32) number of visits to the dentist asked, but its impact on parental knowledge has been measured.

In this study the highest score parents were familiar with the term stem cells a total of 333 study participants gave correct answers to this question and low level of knowledge about the availability of stem cell of deciduous teeth in Iran. In this Goomer et al. (32) The highest score was familiar with the word stem cells and this study and second related to the application of medical knowledge. Moreover, the stem cell legislation and low level of knowledge about the existence of stem cells of deciduous teeth and 40% of parents in the study were aware of the presence of stem cells of deciduous teeth. In this Lyssikatos (31) of 107 parents participated in the study, 104 of whom were unaware of stem cells of deciduous teeth. The study Saran et al (33) parent knowledge of stem cells, application and access to them was poor and non-invasive low level of knowledge from parents

on the use of stem cells and stem cells of knowledge teeth, which is consistent with the study. The enormous advances in the use of dental stem cells in recent years have been established and knowledge and skills in this area have increased. However, knowing the knowledge and attitudes of people in this area is important. In developed countries with established dental stem cell, application of this technology has passed the preliminary stages and most experts believe that in 2020 the process will be treated with stem cells. However, in developing countries is important in its early stages and knowledge is very limited. It is suggested by the results of this study and taking into account the importance of stem cells in treating diseases that parent knowledge through Broadcasting programs, internet, training to the dentist and pediatrician and creates a pamphlet about the use of stem cells to grow deciduous teeth. Alternatively, a similar study on dental students and pediatrician take place.

CONCLUSION

Results of this study showed that awareness of parents of children referred to clinics and dental clinics in Tehran on stem cells of deciduous teeth is weak.

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